Challenges and Opportunities of Scaling-Up Renewable Energy in West Africa


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Presentation outline

1. Foundation of ECREEE
2. Objectives and activities of ECREEE
3. Renewable Energy potentials in West Africa
4. Benefits of RE Integration
5. Existing barriers
The creation of ECREEE

- Directive of the 59th Session of ECOWAS Council of Ministers in Ouagadougou, November 2007, requesting the commission to re-focus its energy Access agenda towards the development of the regions vast renewable energy potential;
- The Ouagadougou Declaration from 12 November 2007 highlighted the need for a regional RE&EE Centre; initial pledge by the Austrian Minister for Foreign Affairs;
- Foundation laid by Regulation C/REG.23/11/08 of the 61st Session of ECOWAS Council of Ministers in Ouagadougou, Burkina Faso, on November 23, 2008;
- Official launch of the ECREEE preparatory phase in November 2009 with support of the ECOWAS Commission, the Austrian Development Cooperation (ADC), the United Nations Industrial Development Organization (UNIDO) and the Government of Cape Verde;
- In 2010 the Spanish Government pledged extensive support to ECREEE from 2010 to 2015;
- **Official launch of ECREEE 6July 2010**
Overall Objective
To contribute to the sustainable economic, social and environmental development of West Africa by improving access to modern, reliable and affordable energy services, energy security and reduction of energy related GHG emissions and climate change impacts on the energy systems;

Specific Objective
Creation of favorable framework conditions and an enabling environment for RE&EE markets by supporting activities directed to mitigate existing barriers;

ECREEE Activities
• Lead and coordinate the implementation of the ECOWAS/UEMOA regional action plan and White Paper on energy access by promoting RE&EE technologies and services;
• Coordination, implementation and fund mobilization for the following activity programs in cooperation with national focal points, international organizations and private sector:
  – Tailored policy, legal and regulatory frameworks and quality standards
  – Capacity building of key groups of different sectors
  – Advocacy, awareness raising, knowledge management and networking
  – Execution of renewable energy programs and projects for demonstration
  – Execution of energy efficiency programs and projects for demonstration
ECREEE secretariat

Map of Cape Verde showing the locations of different cities and the ECREEE Secretariat.
ECREEE Partners

Austrian Development Cooperation
Energy situation in West Africa

• Interrelated challenges of energy poverty, energy security and climate change mitigation and adaptation

• Low energy consumption and service access
  • One of the lowest energy consumption rates of the world;
  • Household access to electricity services is only around 20% (40% in urban and 6-8% in rural areas);
  • Rural areas mainly rely on traditional biomass to meet their energy requirements;
  • Electricity networks mainly serve urban and peri-urban areas; lack of decentralized systems in rural areas;
  • The poor spend more of their income for low quality energy services than better-off for better quality services
  • Energy poverty has severe impacts on the social, economic and environmental development of the region;

• Energy security concerns
  • High energy vulnerability of the region through fossil fuel price volatility (60 % of electricity generation from oil)
  • Gap between rising urban energy demand, available generation capacities and limited investment capital;
  • Lack of regional energy trade (region has considerable but unevenly distributed resources: e.g. gas, oil, hydro);
  • High losses in the energy systems (e.g. high energy intensity and low demand and supply side efficiency);
  • Energy crisis hampers social, economic and industrial development (e.g. cost of blackouts and load shedding)

• Climate changes concerns
  • Increasing energy related GHG emissions (new investments determine GHGs for the next 20 -30 years)
  • Climate change impacts vulnerable West African energy systems (e.g. water flows, extreme weather events)
Figure 3: Annual Electricity Consumption per Capita (kWh/Capita) by Regions of the World (2004)

Source: UNDP, 2007
Lack of energy and its implications for the HDI  
(Focus on West Africa)

Electricity Consumption per Capita (kWh) 
(log scale)

Human Development Index (HDI)

Electricity Demand

ELECTRICITY DEMAND GROWTH IN WEST AFRICA

- Average growth > 7% per year (compound)
- Demand more than triples over study period:
  - 2003: 39 TWh
  - 2020: 140 TWh

2003: Benin & Togo (CEB)
2007: Côte d'Ivoire
2011: Niger, Burkina Faso & Mali
2015: Ghana
2020: Gambia, Guinea-Bissau, Sierra Leone, Liberia, Senegal

Nexant
RE & EE play an important role to address the energy challenges in West Africa simultaneously.

RE potentials so far unexploited:
- 23,000 MW of feasible large and small hydropower potential (16% exploited);
- Huge potential for all forms of bioenergy (e.g. biomass, biogas, biofuel);
- Average solar radiation of 5-6 kWh/m2 per day throughout the year;
- Considerable wind power potential in some countries;
- Considerable tidal, ocean thermal and wave energy resources in some countries;
- RETs are particularly effective in combination with EE measures;

EE potentials so far unexploited:
- Wide range of options to improve supply and demand side efficiency (including energy saving);
- e.g. Equipment labeling and building standards;
- e.g. Cleaner production in industry (e.g. process heat);
- e.g. Technical and commercial losses in the electricity system;
Solar potential

Source: UNEP
Bioenergy potential
First estimation: 5.671 MW unexploited small hydro potential!!

Source: UNIDO
Wind power potential

Source: UNEP
on energy system levels (...)

- **Improvement of energy security through diversification of the energy mix** and reduction of dependency on imported oil products (up to 100% of power generation from diesel)

- **Reduction of generation costs in some countries/regions;** decoupling of generation costs from price volatility of the oil market (crude oil price doubled between 2005 and 2010)

- **Possible reduction of high energy consumer tariffs in some countries/regions** (consumer tariffs are even higher in rural areas)

- Some RE technologies are already **cost-competitive options in relation to conventional options** and are able to cover the rapidly growing energy demand primarily in urban areas

- **Reduction of electricity demand** in combination with energy efficiency and saving measures (e.g. solar thermal heating, cooling and sea water desalination, labeling standards)

- **Provision of energy access to modern, affordable and reliable energy services in rural areas** with no access to centralized grid and supply chains (the majority of the rural population rely on traditional biomass); huge potential for decentralized RE solutions;
Electricity generation costs of different RE technologies in EU-25 (EEG, 2007)

...based on technology-specific lifetime

Estimated average EU-25 external costs for electricity generation (EEA, 2005)
Return on green investment

for sustainable social, economic and environmental development (...)

• Secure, reliable and affordable energy supplies as essential element of social and economic development (e.g. clean water, education, health)

• Possible reduction of the energy bill of national households and increased state ability to invest in other sectors (health, education, industry)

• Possible improved financial situation of utilities and ability to reinvest in generation and transmission infrastructure (e.g. lower generation costs and improved ability and willingness to pay)

• Increased competitiveness and productivity for companies and industry (e.g. lower production costs, savings for hotels, no necessity for decentralized diesel generation)

• Opportunities for private sector development and companies (e.g. PPPs, IPPs, ESCOs); export opportunities for RE products and services (e.g. quality testing, financing)

• Dynamic image and marketing tool for the tourism sector (e.g. Cape Verde)
Return on green investment

for sustainable social, economic and environmental development (…)

• **Increased efficiency and effectiveness of public institution** to deliver their services (e.g. clinics, university)

• **Direct job creation** through construction, installation and maintenance of RE infrastructure and related services (job effects differ from technology to technology)

• **Indirect job creation** in other sectors (e.g. harvesting of biomass feedstock)

• **Increased household income** opens up opportunities for other productive uses

• **Improved live conditions for poor population groups** in rural areas (access to light, reduction of indoor pollution, access to clean water)

• **Reduction of energy related negative environmental externalities** (e.g. air, water and soil pollution, degradation, deforestation)

• **Reduction of energy related GHG emissions**
Existing Barriers for RE & EE

Various technical, economic, financial, institutional, legal an capacity related barriers for RE&EE exploitation:

- Lack of tailored RE&EE policy, legal and regulatory frameworks;
- Lack of RE & EE quality standards and appraisal tools;
- Low capacities and RE&EE knowledge base of key groups in public and private sectors;
- Lack of awareness of key groups in public and private sectors on different levels (e.g. federal, provincial); lack of advocacy and lobby groups;
- Lack of risk and investment capital and tailored financial schemes;
- Lack of technology transfer and adaptation of technologies;
- Lack of regional approaches, forums and information exchange of like-minded key groups;
• Website in English, French and Portuguese
• Sign-up for E-Newsletters
Thank you! Merci! Muito obrigado!

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